Applied Mathematics I - Worksheet #14

Professor Broughton

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For the following D.E.'s …nd the free response solution, the zero state forced response solution and the combined solution. Make a combined plot of the three di¤erent solutions and the forcing function. Use any method you like but be sure you try the convolution method. Check your answers with Maple.

1. $y'(t) + :1y(t) = 1;\ y(0) = 5:$

2. $1:5x'(t) + x(t) = 10\cos(4t) + \sin(30t);\ x(0) = 5:$

3. $x'(t) = -0.1x(t) + 2u(t - 5);\ x(0) = 10;$ ($u(t)$ is the unit step function).

4. $x'(t) + .5x(t) = 3u(t - 5) - 3u(t - 10);\ x(0) = 10.$